

REMARKS/ARGUMENTS

This Amendment is in response to the Office Action mailed December 7, 2005 in the above-identified application. Based on the foregoing amendments and the following remarks, careful reconsideration and allowance of the application are respectfully requested.

Claims 1-25 remain pending in this application. By this Amendment, claims 1, 9, 10, 11, 12, 13, 17, 18, and 25 have been amended in order to more particularly point out the invention.

Applicants thank the Examiner for indicating claims 15 and 16 contain allowable subject matter. However, based on the foregoing amendments and following remarks, Applicants respectfully submit all the pending claims are now in condition for allowance.

The Examiner issued rejections in light of newly cited references Murto (US 6,356,026) and Raspagliesi et al. (US 5,144,143, hereinafter "Raspagliesi"). In particular, the Examiner rejected claims 1-3, 8, and 25 under 35 USC §102(e) as being anticipated by Murto. Claim 17 was rejected under 35 USC §102(b) as being anticipated by Raspagliesi. Claims 4-6, 9-14 and 18-24 were rejected under 35 USC §103(a) as being unpatentable over Murto in view of Raspagliesi. Claim 7 was rejected under 35 USC §103(a) as being unpatentable over Murto in view of Raspagliesi and further in view of Seidl (US 4,783,595). Applicants respectfully traverse all these rejections.

35 USC §102 Rejections

Claims 1-3, 8, and 25 were rejected under 35 USC §102(e) as being anticipated by Murto. Turning to amended claim 1, Applicants' amended claim 1 requires "an indirectly heated cathode having an outer periphery and an interior area; and a support rod fixedly attached to the interior area of the indirectly heated cathode for supporting the cathode within an arc chamber of the ion source and avoiding gas introduction and high pressure near the support rod." No new matter has been entered and support can be found throughout the specification including, but not limited to, FIGs. 1, 2A, 2B, and Paragraphs [0046], [0047], and [0048] of Applicants' Patent Application Publication US 2001/0043040.

Murto teaches an ion implant source with "structurally identical indirectly-heated ion source assemblies 66 and 68" (Column 6, line 27) illustrated in Murto's embodiments of FIGs. 5 and 6. With reference the assembly 66, Murto indicates the assembly includes a cathode 72

having “an emitter/reflector portion 72_{er} as well as insulating sides 72_s.” Column 6, lines 49-50. The insulating sides 72_s are fixed to an outer periphery of the emitter/reflector portion 72_{er} as illustrated in Murto’s FIGs. 5 and 6. Thus the cathode 72 including the emitter/reflector portion 72_{er} and the sides 72_s is shaped “in the form of a hollow container” (Column 6, lines 44-45) with an open end to receive the pigtail portion 70_{ptl} of the filament 70.

As explained in the Background section of Applicants’ published Application, “[k]nown prior art indirectly heated cathode designs utilize a cathode in the form of a disk supported at its outer periphery by a thin wall tube of approximately the same diameter as the disk.” (Emphasis added.) Paragraph [0006], lines 5-8 of Applicants’ Patent Application Publication US 2001/0043040. However, drawbacks with this type of cathode support are that the tube “has a large surface area, much of it at high temperature. This area loses heat by radiation, which is the primary way that the cathode loses heat.” Paragraph [0007], lines 2-4 of Applicants’ Patent Application Publication US 2001/0043040. In addition, the “large diameter of the tube increases the size and complexity of the structure used to clamp and connect to the cathode.” Paragraph [0007], lines 4-6 of Applicants’ Patent Application Publication US 2001/0043040.

Therefore, rather than having a support rod “fixedly attached to the interior area of the indirectly heated cathode” as required by claim 1, Murto teaches that the sides 72_s of the cathode 72 are attached to an outer periphery of the cathode which suffers from the aforementioned drawbacks.

Accordingly, Applicants respectfully submit claim 1 is allowable. Claims 2, 3, and 8 depend directly or indirectly from claim 1 and are allowable for at least the same reasons as claim 1.

Claim 25 is an independent claim requiring “an indirectly heated cathode having an outer periphery and an interior area; and a support rod press fitted to the interior area of the indirectly heated cathode for supporting the cathode within an arc chamber of the ion source which avoids gas introduction and high pressure near the support rod” and is patentable over Murto for at least the same reasons as claim 1.

Claim 17 was rejected under 35 USC §102(b) as being anticipated by Raspagliesi. Claim 17 is a method claim requiring “supporting the cathode having an outer periphery and an interior area by a rod fixedly attached to the interior area of the cathode which avoids gas introduction and high pressure near the rod; and bombarding the cathode with electrons.” (Emphasis added.)

The Examiner argues that element 24 of Raspagliesi is a cathode. Applicants respectfully disagree. Raspagliesi does not disclose any cathode, and certainly not a cathode as specified in claim 17. Raspagliesi teaches a device for ionizing metals having a high melting point. Element 24 of Raspagliesi is the metal to be ionized which is placed in the arc chamber 15 (Column 3, lines 13-14). The ions of the metal 24 are “extracted from the arc chamber through the aperture 36 of the cover 38 ... and lastly implanted into the semiconductor to be doped.” Column 4, lines 7-12. Accordingly, Applicants respectfully submit claim 17 is allowable.

35 USC §103 Rejections

Claims 4-6, 9-14 and 18-24 were rejected under 35 USC §103 as being unpatentable over Murto in view of Raspagliesi. Claims 4-6 depend directly or indirectly from claim 1 and as such incorporate the limitations of claim 1. For similar reasons earlier adduced regarding the 35 USC §102 rejections, Applicants respectfully submit claim 1 is allowable over Murto. Claim 4 further narrows claim 1 by requiring at least that “the support rod is fixedly attached at or near the center of the cathode, along an axis of the cathode.” Claims 5 and 6 depend further, directly or indirectly, from claim 4. Applicants respectfully submit that Raspagliesi does not provide the missing teachings of Murto. In particular, Raspagliesi does not disclose a cathode as element 24 of Raspagliesi is a metal to be ionized and not a cathode.

Claim 9 is an independent claim requiring “a cathode having an outer periphery and an interior area and a support rod fixedly mounted to the interior area of the cathode which avoids gas introduction and high pressure near the support rod” and is patentable over Murto for at least the same reasons earlier adduced regarding claim 1. Raspagliesi does not provide the missing teachings of Murto as Raspagliesi does not teach, suggest, or disclose a cathode. Claims 10-11 depend directly or indirectly from claim 9 and are allowable for at least the same reasons as claim 9. In particular, both claims 10 and 11 also require that the “filament is disposed around the support rod.” The filament 70 of Murto is disposed within an interior volume 72i created by the portions 72s and 72er of the cathode 72 (Column 6, lines 43-44), and is not disposed around a support rod as required by claims 10 and 11.

Claims 12 and 13 are independent claims requiring “a cathode having an outer periphery and an interior area and a support rod fixedly mounted to the interior area of the cathode” and are patentable over Murto and Raspagliesi for at least the same reasons earlier adduced. Claim 14


depends directly or indirectly from claim 13 and is allowable for at least the same reasons as claim 13.

Claim 18 is an independent claim requiring at least “a cathode having an outer periphery and an interior area; a support rod fixedly attached to the interior area of the cathode which avoids gas introduction and high pressure near the support rod” and is patentable over Murto and Raspagliesi for at least the same reasons earlier adduced. Claims 19-24 depend from independent claims 1, 9, 12, 13, 17, and 18 and are allowable for at least the same reasons as their respective independent claims.

Claim 7 was rejected under 35 USC §103 as being unpatentable over Murto in view of Raspagliesi and further in view of Seidl. Claim 7 depends from claim 5, which depends from claim 4, which itself depends indirectly from claim 1. Claim 7 is allowable over Murto and Raspagliesi for at least the same reasons as claim 4 earlier detailed. In addition, Seidl does not provide the missing teachings of Murto and Raspagliesi. Seidl teaches a heating filament 10 that surrounds an ion-emission pellet 1 to heat the pellet 1 to an ion-emission temperature. Column 8, lines 56-60. Seidl does not teach an indirectly heated cathode and thus fails to cure the deficiencies of Murto and Raspagliesi. Furthermore, Seidl fails to disclose, teach, or suggest a “spring loaded clamp for holding the support rod” for an indirectly heated cathode as required by claim 7. Rather, the spring 7 of Seidl is part of a compression assembly 25 for pressing the ion-emission surface 22 of the ion-emission pellet 1 against an electrically-conducting beam forming electrode 4. Column 8, lines 32-35, and lines 44-47.

Accordingly, Applicants respectfully submit that in light of the foregoing claim amendments and remarks all of the presently pending claims in condition for allowance. Reexamination and reconsideration are respectfully requested. Early allowance is earnestly solicited. In the event the Examiner deems personal contact desirable in disposition of this application, the Examiner is respectfully requested to call the undersigned attorney. Please charge any additional fees or credit any overpayments to deposit account No. 50-0896.

Respectfully submitted,
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